Extreme Temperature Gearhead, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

In response to the need for actuators that can operate in the harsh Venusian environment for extended periods of time, Honeybee Robotics conducted extensive research and testing to resolve the tall poles in developing an extreme temperature gear. During the Phase I effort, multiple gear material and lubrication candidates were tested under load in Venus-like conditions (486

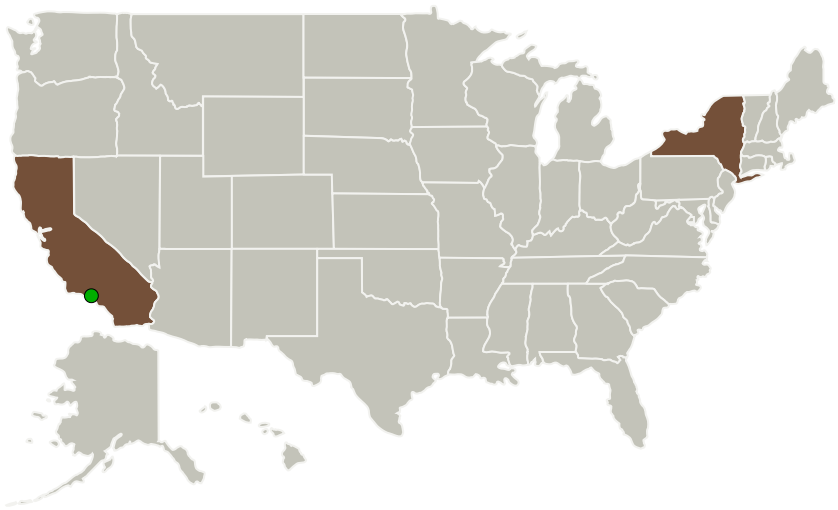
o

C temperature and mostly CO2 gas environment). Test results verified the feasibility of a design and confirmed that, with proper material and lubrication selection, the gear head could operate at 486

o

C for an extended period of time. In a potential Phase II effort, material and lubrication study will continue as well as a high temperature bearing study. At the end of the Phase II, an extreme environment actuator, including a HT motor, HT sensor for commutation and multi-stage HT gear head, will be developed and tested to TRL 6.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Honeybee Robotics, Ltd.	Lead Organization	Industry	Pasadena, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	New York

Project Transitions

June 2011: Project Start

September 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138854)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Honeybee Robotics, Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jerri Ji

Co-Investigator:

Jerri Ji

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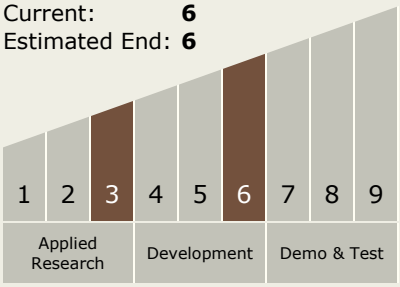
Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.4 Surface Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System